Nutrition and Your Health: ARS Studies Target Nutrition's Vital Roles

This issue of *Agricultural Research* magazine focuses on nutrition and your health, a topic that continues to make headlines. Indeed, First Lady Michelle Obama has been in many of those headlines for her work to boost awareness of, and help resolve, a nationwide nutrition-related health problem—the epidemic of childhood obesity.

Obesity is more than extra pounds and tight clothes. It is an underlying factor for chronic diseases including heart disease, some cancers, and diabetes.

But other health conditions may also be influenced by nutrition. As the U.S. population ages, we are increasingly confronted with declining eyesight, bone strength, and cognitive abilities. Recent studies suggest that diet is involved in these conditions.

In many ways, the 20th century was the "Nutrition Century." Numerous essential nutrients were discovered and characterized, and the amounts needed for good health were determined. Based on such findings, dietary sources of these nutrients were identified, and foods fortified with these nutrients were developed. As a result, nutrient-deficiency diseases all but disappeared in this country.

The Agricultural Research Service, which operates human nutrition research centers in Beltsville, Maryland; Boston, Massachusetts; Grand Forks, North Dakota; Little Rock, Arkansas; Houston, Texas; and Davis, California, was heavily involved in that research. Scientific studies conducted by ARS scientists at these centers were instrumental in many of the successes.

With deficiency diseases nearly eliminated, nutrition researchers set their sights on eliminating chronic disease. Based on the past record, quick progress was expected.

But chronic disease turned out to be a greater challenge. An example: In the 1980s, a prominent researcher suggested that diet accounts for up to 60 percent of all cancers. Numerous dietary recommendations aimed at reducing cancer were made. Several large-scale nutrition intervention trials were conducted.

The result?

Cancer remains one of our most prevalent chronic diseases. Many of the intervention trials failed. Some actually increased cancer, thus pointing out the difficulty of taking epidemiological observations—studies on the cause, spread, and control of diseases—and translating them into simple human nutrition interventions.

We may have done better with heart disease. But it is still hard to determine whether decreased incidence is mainly a result of improved nutrition or, alternatively, of pharmaceutical interventions.

So what makes research on the role of nutrition in prevention of chronic disease so challenging?

It turns out that links between diet and chronic disease are very complex. Much more research is needed to unravel these complexities. But as the articles presented here clearly show, ARS researchers are fully engaged in solving these intricate puzzles.

A major problem encountered by nutrition and medical researchers is that, in some people, nutrition interventions can help counter chronic disease, while in others, they may have little or no measurable effect. We have learned that much of this variability comes from mutations—called "polymorphisms"—in specific genes. Several of this month's articles discuss how diet interacts with a person's genes to influence chronic disease risk.

Nutrient timing may be critical; several articles address how nutrients consumed during one timeframe are beneficial, but, perhaps surprisingly, can be ineffective or even dangerous when consumed during another interval.

Nutrient-to-nutrient interactions are important, too. One article discusses how some nutrients are only protective for the eye if they are consumed as part of a particular diet. Lifestyle has an effect, as well. In this issue, for instance, you'll read about research into the interaction of sun exposure, skin tone, and our vitamin D requirements (page 8).

Studies such as these continue to show that nutrition researchers and health educators alike need to help consumers put research findings into a sensible overall perspective. For example, the article on heart health (page 12) shows that consumers have focused for too long on either low-fat diets or on eliminating specific types of fat from their diet, instead of emphasizing an overall healthy diet and, in instances of overweight or obesity, reducing total calories.

We need to continue to deliver solid information that makes a difference in public health. We need to adopt an "evidence-based" approach in which the goal is to make public recommendations based only on scientifically sound studies in humans. Studies done in cell cultures, with laboratory animals, with some types of epidemiological data, or with limited numbers of human volunteers can, of course, continue to give us excellent hypotheses, but they should not be used to make public recommendations affecting millions of Americans.

It is a brave new world for nutrition scientists. The answers we seek are complicated and come only after much hard work and, often, many setbacks. On the following pages, you'll see that we are indeed making very real progress.

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